CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528

Office (435) 687-2450
FAX (435) 687-2084

May 30, 2003

Gregg Galecki
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Re: Response to Informal Conference Technical Analysis dated March 26, 2003, Hiawatha Mine Complex, C/7007/011-AM02B-2

I have made the changes you requested on the pages and plates and have included them for you to add to the amendment.

If you have any questions, please call me at (435) 687-5238.

Thank You,

Mark Reynolds,
Environmental Coordinator

Wide panels, the maximum subsidence at the surface is a function of thickness of coal seam extracted and depth of cover. The thicker the extracted coal, the greater the subsidence. Conversely, the deeper the cover, the less the subsidence due to swell of gob. In areas where multiple seam mining is practiced, the maximum combined thickness of fully extracted coal may amount to as much as 25 feet. Cover depths over full extraction areas may range from 300 to 2,000 feet, with maximum subsidence ranging from 20 feet down to 3 feet, respectively, in areas where total thickness extracted is 25 feet. These estimates represent extreme condition which are rarely encountered. More typical subsidence for the permit area would range from 7 feet down to 1.2 feet for the 300 to 2,000 foot cover depths, respectively. These predications are based on data collected by the National Coal Board (UK) for their "Subsidence Engineer's Handbook" (1975). Hiawatha Coal Company does not expect subsidence to be greater then 10 feet in any area.

No significant surface structure such as building, power lines, pipelines or oil-and-gas wells exist within projected mining areas. A few dirt roads, fence lines and stock watering ponds do exist and could be influenced. A subsidence monitoring plan has been developed and is discussed in Chapter 5, Engineering.

8/30/03

Table 7-1

Results of Spring Inventory Conducted On and Adjacent To Hiawatha's Permit In October, 1983

TION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
15-7-11-1	1	260	Steep slopes (base of Castlegate Sandstone)	Deer tracks	Chem date in WRI 81-539
11-2	Seep		At sandstone - Shale interface (base of Castlegate ss)	None	Dry
11-3	Seep		At sandstone - Shale interface (in Blackhawk Formation)	None	
11-4	Seep		In limestone (North Horn FM.)	None	
15-7-12-1	<1	260	Base of limestone (North Horn FM.)	Deer tracks	Chem data in BDR 31
15-7-13-1	1	320	Fractured sandstone within limestone (North Horn FM)	Developed with trough	
13-2	Seep		In limestone (North Horn FM.)	None	
13-3	4	320	Fractured sandstone within limestone (North Horn FM)	Wildlife	
13-4	Seep		In limestone (North Horn FM.)	Developed as pond. Cattle\deer tracks	
13-5	Seep		In limestone (North Horn FM.)	Deer & cattle tracks	
13-6			In limestone (North Horn FM.)	Developed as pond. Cattle & deer tracks	
14-7-14-1			In limestone (North Horn FM.)	Deer & cattle tracks	
[redacted]14-2	Seep		In limestone (North Horn FM.)	Developed as pond. Cattle & deer tracks	No outflow
14-3	7	380	In limestone (North Horn FM.)	Deer & cattle tracks	Chem. data in WRI 81-539
14-4	Seep		In limestone (North Horn FM.)	Deer & cattle tracks	
14-5	Seep		In limestone (North Horn FM.)	Deer tracks	
14-6	8	320	At base of resistance unit (North Horn FM.)	Fenced, developed	U.S.Fuel monitor- ing station SP-3
15-7-15-1	2	400	In limestone (North Horn FM.)	Fenced, developed	Chem. data in BRD 31 & WRI 81-539
15-2	Seep		In limestone (North Horn FM.)	Deer & cattle tracks	
15-3	Seep		In limestone (North Horn FM.)	Deer tracks	
15-4	Seep		In limestone (North Horn FM.)	Deer tracks	
15-5	2	540	Base of limestone (North Horn FM.)		Chem. data in
15-6	4	480	From fractured sandstone (Price River Fm)	Deer & cattle tracks	WRI 81-539
15-7	2	370	At base of limestone (North Horn FM.)	Deer tracks	Chem. data in WRI 81-539

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

4/28/03

Table 7-1 (Continued)

Results of Spring Inventory Conducted On and Adjacent To Hiawatha's Permit In October, 1983

TION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
15-7-22-1	1	430	At sandstone-shale interface (Price River Fm.)	None	Chem. data in WRI 81-539
22-2	10	430	Near base of sandstone (Price River Formation)	Deer & cattle tracks	
22-3	12	390	Near base of sandstone (Price River Formation)	Deer & cattle tracks	
22-4	Seep		Fractured Sandstone (Castlegate sandstone)	Deer & cattle tracks	
15-7-23-1	Seep		At sandstone - Shale interface (in Price River Fm.)	Deer & cattle tracks	Possible past development
23-2	Seep		Near base of limestone (in North Horn Fm.)	None	
23-3	5		Base of fractured sandstone (in Price River Fm.)	Deer & cattle tracks	Not sampled
23-4	Seep		Near base of limestone (North Horn Formation)	Deer tracks	
15-7-24-1	Seep		Fractured sandstone within limestone (North Horn Fm.)	Wildlife	Diffuse seepage
24-2	8	340	At base of steep slope (in North Horn Fm.)	Deer & cattle tracks	
24-3	5	360	In fractured limestone (North Horn FM.)	Deer & cattle tracks	
24-4	Seep		Limestone slope (North Horn Fm.)	Deer tracks	Diffuse seepage
-25-1	Seep		Base of limestone (North Horn Fm.)	Deer tracks	
25-2	8	540	Near base of limestone (North Horn Fm.)	Deer & cattle tracks	Chem data in WRI 81-539
25-3	2		Near base of limestone (North Horn Fm.)	Deer tracks	Not sample
25-4	Seep		Base of limestone (North Horn Fm.)	Deer tracks	
15-7-26-1	Seep		Near base of limestone (North Horn Fm.)	None	
26-2	2	480	Near base of limestone (North Horn Fm.)	Deer & cattle tracks	Chem data in WRI 81-539
26-3	5	500	Near base of limestone (North Horn Fm.)	Deer tracks	Field data in WRI 81-539
26-4	15	460	Near base of limestone (North Horn Fm.)	Deer & cattle tracks	Field data in WRI 81-539
15-7-27-1	29	440	Base of limestone (North Horn Fm.)	Deer tracks	Chem data in WRI 81-539
27-2	11	310	Base of limestone (North Horn Fm.)	Deer tracks	Field data in WRI 81-539
15-7-34-1	Seep		At sandstone-shale interface (Price River Fm.)	None	Diffuse seepage
34-2	Seep		At sandstone-shale interface (Price River Fm.)	None	

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

4/28/03

Table 7-1 (Continued)

Results of Spring Inventory Conducted On and Adjacent To Hiawatha's Permit In October, 1983

[redacted]TION [redacted]BER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
15-7-34-3	Seep		At sandstone-shale interface (Blackhawk Fm.)	Deer tracks	Diffuse seepage
34-4	1	500	At sandstone-shale interface (Blackhawk Fm.)	Deer & cattle tracks	
34-5	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	In road cut
34-6	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	In road cut
15-7-35-1	5	410	Fracture sandstone (Castlegate sandstone)	Cattle tracks	Chem data in WRI 81-539
35-2	Un-known	580	Fractured sandstone (Blackhawk Fm.)	Developed, manhole & valve	Chem data in WRI 81-539
36-3	Seep		At sandstone-shale interface (Blackhawk Fm.)	Deer tracks	
15-7-36-1	1	340	At sandstone lense in limestone (North Horn Fm.)	Deer tracks	
36-2	5	410	At sandstone lense in limestone(North Horn Fm.)	Deer & cattle tracks	
36-3	5	320	In limestone (North Horn Fm.)	Cattle tracks	
15-8-7-1	Seep		Near Base of limestone (North Horn Fm.)	Deer & cattle tracks	
7-2	Seep		Near Base of limestone (North Horn Fm.)	Deer tracks	
[redacted]7-3	5	350	At base of limestone (North Horn Fm.)	Deer tracks	U.S.Fuel monitor ing station SP-14
7-4	2	330	In limestone (North Horn Fm.)	Deer & cattle tracks	
7-5	Seep		At sandstone-shale interface	None	
15-8-17-1	Seep		At base of limestone (North Horn Fm.)	None	
17-2	1	320	Near base of limestone (North Horn Fm.)	Deer tracks	
15-8-18-1	2	300	At base of limestone (North Horn fm.)	Deer & cattle tracks	U.S.Fuel monitor ing station SP-1
18-2	Seep		At sandstone-shale interface (Price River Fm.)	Deer tracks	
18-3	Seep		At sandstone-shale interface (Price River Fm.)	Deer tracks	
18-4	2	350	At base of limestone (North Horn Fm.)	Deer & cattle tracks	U.S.Fuel monitor ing station SP-2
18-5	5		Base of sandstone ledge (Castlegate sandstone)	None	Diffuse seepage
15-8-19-1	Seep		At sandstone-shale interface (Price River Fm.)	None	
19-2	4	480	Fractured sandstone (Castlegate sandstone)	Some deer tracks	U.S.Fuel monitor ing station SP-11
15-8-19-3	Seep		At base of limestone (North horn Fm.)	None (inaccessible)	Not sampled

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

Table 7-1 (continued)

Results of Spring Inventory Conducted On and Adjacent To Hiawatha's Permit In October, 1983

L[redacted]ION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
19-4	Seep		At sandstone-shale interface (Blackhawk Fm.)		
19-5	4	480	At sandstone-shale interface (Castlegate sandstone)	Deer tracks	
19-6	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
19-7	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
19-8	Seep		At sandstone-shale interface (Blackhawk Fm.)	Some deer tracks	
15-8-30-1	3	460	In limestone above resistant layer (North Horn Fm.)	Developed	sampled at spring box
30-2	2	490	Base of sandstone ledge (Castlegate sandstone)	Deer tracks	
30-3	1	520	Base of sandstone ledge (Castlegate sandstone)	Deer tracks	
30-4	8	530	At base of sandstone (Castlegate sandstone)	Deer tracks	U.S.Fuel monitor ing station SP-12
30-5	5	470	At base of sandstone, above claystone (Castlegate ss)	Deer tracks	
30-6	Seep		Sandstone-shale interface (Blackhawk Fm.)	None	
[redacted]-1	<1	350	In limestone below resistant layer (North Horn Fm.)	Developed with pond & trough	U.S.Fuel monitor ing station SP-4
321-2	Seep		In limestone (North Horn Fm.)	None	In roadway
31-3	<1	280	In limestone (North Horn Fm.)	None	In roadway
31-4	4	460	Base of fractured sandstone (Castlegate sandstone)	Deer tracks	U.S.Fuel monitor ing station SP-13
31-5	2	640	Base of fractured sandstone (Castlegate sandstone)	Developed	
15-8-32-1	<1	1030	At sandstone-shale interface (Blackhawk Fm.)	None	
32-2	10	580	From fractured sandstone (Star Point sandstone)	Deer tracks	
16-7-1-1	5	400	In limestone (North Horn Fm.)	Deer & cattle tracks	Chem data in WRI 81-539
1-2	5	380	In limestone (North Horn Fm.)	Flows into stock pond	U.S.Fuel monitor ing station SP-7
1-3	Seep		In limestone (North Horn Fm.)	Livestock	fenced
1-4	Seep		At base of resistant layer (North Horn Fm.)	Livestock	
1-5	3	400	At base of resistant layers (North Horn Fm.)	Deer tracks	Diffuse seepage
16-7-2-1	Seep		In limestone (North Horn Fm.)	Deer & Cattle tracks	

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

Table 7-1 (Continued)

Results Of Spring Inventory Conducted On And Adjacent To Hiawatha's Permit In October, 1983

LOCATION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
16-7-11-1	<1	500	At sandstone-shale interface (Price River Fm.)	Deer tracks	Diffuse seepage
16-7-11-2	5	390	From fractured sandstone in limestone (North Horn Fm.)	Deer tracks	Chem. data in WRI 81-539
11-3	3	390	From fractured sandstone in limestone (North Horn Fm.)	Deer & cattle tracks	
11-14	1	540	Near base of limestone (North Horn Fm.)	Deer tracks	Field data in WRI 81-539
16-7-12-1	Seep		From sandstone (North Horn Fm.)	None	
12-2	2	450	From fractured sandstone (North Horn Fm.)	Deer tracks	
12-3	1	420	Base of resistant layers (North Horn Fm.)	Deer tracks, trails	Near surface displacement
12-4	Seep		In limestone (North Horn fm.)	Deer tracks, trails	Diffuse seepage
12-5	5	520	In limestone (North Horn Fm.)	Deer tracks	Chem data in WARI 81-539
16-7-13-1	3	330	Base of fractured limestone (North Horn Fm.)	Deer & cattle tracks	U.S.Fuel monitor ing station SP-9
13-2	2		At sandstone-shale interface (Price River Fm.)	None	Not sampled
[redacted]3	5	390	From fractured sandstone above shale (Price River Fm.)	None	
13-4	Seep		At sandstone-shale interface (Price River Fm.)	None	
16-7-13-5	Seep		At sandstone-shale interface (Price River Fm.)	None	Diffuse seepage
13-6	Seep		At sandstone-shale interface (Price River Fm.)	Deer tracks	Diffuse seepage
13-7	10	360	At sandstone-shale interface (Price River Fm.)	None	Sampled at bottom of main canyon
13-8	8	310	At sandstone-shale interface (Price River Fm.)	None	Sampled at bottom of main canyon
13-9	Seep		At sandstone-shale interface (Price River Fm.)	None	
13-10	Seep		At sandstone-shale interface (Price River Fm.)	None	
13-11	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
13-12	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
13-13	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
13-14	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
16-7-13-15	3	490	Base of limestone (North Horn Fm.)	Deer & cattle tracks	

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

4/28/03

Table 7-1 (continued)

Results of Spring Inventory Conducted On and Adjacent To Hiawatha's In October, 1983

LOCATION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
16-7-23-1	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
16-7-24-1	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
24-2	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
24-3	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	Diffuse seepage
16-7-25-1	Seep		From fractured sandstone (Star point sandstone)	None	
25-2	Seep		From fractured sandstone (Star point sandstone)	None	
25-3	<1	5470	From bottom of channel (Mancos shale)	Deer tracks	Shale outcrops in channel downstream
16-7-26-1	>100	470	From fractured sandstone (Star point sandstone)	Developed City water supply	Bear Canyon spring Data in WRI 81-539
26-2	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
26-3	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	
26-4	8	730	From fractured sandstone (Star point sandstone)	Deer tracks	Birch spring Data in WRI 81-539
16-7-26-5	>50	750	From fractured sandstone (Star point sandstone)	Deer tracks	Chem. data in WRI 81-539
16-8-5-1	3	450	In limestone (North Horn Fm.)	Developed, with trough	U.S.Fuel monitor ing station SP-5
16-8-6-1	3	450	Base of fractured sandstone (North Horn Fm.)	Deer & cattle tracks	U.S.Fuel monitor ing station SP-6
6-2	Seep		Base of resistant layer (North Horn Fm.)	None	
6-3	Seep		From road cut (north Horn Fm.)	None	
6-4	Seep		From road cut (north Horn Fm.)	None	
6-5	Seep		From road cut (north Horn Fm.)	None	
16-8-7-1	Seep		From road cut (Price River Fm.)	None	
7-2	10	440	From fractured sandstone (North Horn Fm.)	Deer & cattle tracks	
16-8-8-1	5	560	Fractured sandstone (Castlegate sandstone)	Deer tracks	
8-2	7	640	Fractured sandstone (Castlegate sandstone)	Deer tracks	Diffuse seepage in road cut
8-3	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	In road cut
16-8-8-4	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	In road cut

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

Table 7-1 (continued)

Results of Spring Inventory Conducted on and Adjacent To Hiawatha's Permit In October, 1983

LOCATION NUMBER	FLOW (gpm)	SPECIFIC CONDUCTANCE (umhos/cm @ 25° C)	GEOLOGIC CONDITIONS	SIGNS OF USAGE	COMMENTS
8-5	6	730	Colluvium overlying sandstone (Blackhawk Fm.)	Developed	U.S.Fuel monitor ing station SP-8
16-8-8-6	Seep		At sandstone-shale interface (Blackhawk Fm.)	None	In road cut
16-8-9-1	Seep		Sandstone in road cut (Star Point Fm.)	None	
16-8-17-1	5	500	Near base of limestone (North Horn Fm.)	Deer & Cattle tracks	
17-2	5	490	Near base of limestone (North Horn Fm.)	Deer & Cattle tracks	
16-8-18-1	3		Fractured limestone (North Horn Fm.)	Deer & Cattle tracks	Not sampled
18-2	3	600	Fractured limestone (North Horn Fm.)	Deer & Cattle tracks	Field data in WRI 81-539
18-3	9	520	In limestone (North Horn Fm.)	Deer & Cattle tracks	Chem. data in WRI 81-539
16-8-19-1	<1	570	Base of fractured sandstone (Castlegate sandstone)	Deer tracks	Chem. data in WRI 81-539
16-8-20-1	3	700	Base of limestone (North Horn Fm.)	Cattle tracks	U.S.Fuel monitor ing station SP-10
20-2	Seep		Near base of limestone (North Horn Fm.)	Deer tracks	
16-8-21-1	<1	2820	At sandstone-shale interface (Blackhawk Fm.)	None	
21-2	4	2630	Fractured sandstone (Star Point sandstone)	Deer tracks	Field data in WRI 81-539
16-8-28-1	9	2230	Base of sandstone (Star Point sandstone)	Developed, with trough	

- **The spring names are based on the township, range, and section where they are located. Example: The 3rd spring found in Township 15 S, Range 7 E, Section 15 is named 15-7-15-3.**

4/28/03

Canyon. The King 6 mine is currently inactive and the water tank is not being used. ~~Mine water discharge sample analyses for past years is given in Appendix 7-13.~~

During the 2002 ~~1992~~ permit review the Division requested that persistent and measurable in-mine flows be monitored for quality quantity and seasonal variations. Currently all portals are sealed so no in-mine monitoring can be done. Once the seals are breached and mining is resumed Hiawatha will develop an underground water monitoring plan to monitor all flows that are greater than 5gpm and last for more than 30 days. The Division will be consulted during the development of this plan. ~~Towards this end U. S. Fuel will monitor the flow at point UG-1 (Exhibit 6-3). No mine workings are currently accessible south of this point and only a very limited area is accessible to the north and east. Due to the dip of the beds, monitoring the flow at this location will reflect the cumulative result of all sources originating in the King 4 mine north of the 10 West and 10 East sections. UG-1 will be monitored once in the spring (May or June) and once in the fall (Sept. or Oct.).~~ Monitoring parameters will be the same as those required by the EPA NPDES permit listed in Table 7-13 ~~14~~.

SURFACE WATER MONITORING PLAN

~~United States Fuel~~ Hiawatha Coal Company currently monitors streams described in this program on a monthly basis when accessible. The location of each monitoring point is shown on Exhibit 7-1 and described in Table 7-15. Sample analyses are done semi-annually. Table 7-17 shows the sampling frequency for each of the sites. ~~Table 7-16 presents the initial comprehensive parameter schedule used in September of 1979. Table 7-17 presents the routine analytical parameter schedule that has been followed from September 1979 to May 1986. From May 1986 to August 1988 Table 7-18 was used.~~ Samples collected ~~after 1988~~ will be analyzed according to either Table 7-15~~19~~ or 7-16~~20~~. ~~The type of analyses to be done will depend on the~~

Map(s) is kept with this application located in the Public Information Center of our Salt Lake City office.

PLATE 7-2 SEEPS AND SPRINGS

PLATE 7-7 SUBSIDENCE